tabolism occurs principally in the mitochondria(9), in which GOT has been observed to be concentrated(10,11), the evidence cited would appear to implicate GOT in myocardial metabolism. GOT converts aspartic acid to oxalacetic acid. The increased GOT may furnish more oxalacetic acid to the citric acid cycle and thus might offer a potential source of energy to the animal. This could be a means of meeting the increased work load placed on the heart by elevated blood pressure.

Summary. The glutamic-oxalacetic transaminase (GOT) activity and blood pressure were determined in normal animals and in animals with elevated blood pressure. Blood pressure was elevated by use of bands of teflon tubing placed around the abdominal aorta. This procedure resulted in an increase in both systolic and diastolic blood pressures within a period of 5 to 6 weeks. GOT was elevated above control levels in the left ventricle, but was unchanged in the right ventricle.

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Specific Activity of Inulin-C^{14}OOH in Serum and Lymph of Nephrectomized Dog.* (29152)

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It was recently shown that the radioactively labelled inulin derivatives, inulin-C^{14}OOH and inulin-OCH$^{3}_{3}$, may differ in size and charge from inulin and give rise to physicochemical separation in several *in vitro* systems. These included dialysis, ultrafiltration, sephadex gel filtration and paper electrophoresis(1).

No fractionation between inulin-C^{14}OOH and inulin could be shown in glomerular filtration in the dog, but a decline in the urine specific activity following a single intravenous injection suggested fractionation at an extrarenal level. Specific activities of serum inulin could not be obtained experimentally owing to rapid excretion of inulin into the urine. It was inferred, however, that the falling specific activity of the urine inulin may have reflected changes in blood plasma, since no fractionation of the labelled inulin derivatives from inulin took place at the renal glomeruli. We suggested, therefore, that radioactive inulin-C^{14}OOH could be removed more rapidly than inulin from the circulation by extrarenal processes.

Reported herein are the results of an experiment performed on a nephrectomized dog which enabled measurement of serum and lymph specific activities. Inulin-C^{14}OOH (found to be smaller than inulin by ultrafiltration) moved more rapidly than inulin into thoracic duct lymph, thus demonstrating a

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TABLE I. Ultrafiltration of Inulin-C^{14}OOH and Inulin.

Lot No. Inulin-C^{14}OOH	Specific activity c.p.m./μg		
	Original	UF 0-2 hr	UF 2-5 hr
46-271-12	4.9	4.7	4.5
35-211-1	60.9	172.6	157.4

physiological counterpart to previously reported *in vitro* separations.

Materials and methods. Radioactively labelled inulin-C^{14}OOH was purchased from New England Nuclear Corp., Boston, Mass. Non-radioactive inulin was Warner-Chilcott 10% solution (Control No. 205191).

Serum C^{14} was counted in the Technical Measurement Corp. LP-1 liquid scintillation counter using the method of Chen(2) and inulin was chemically determined by the resorcinol method of Schreiner(3). Ultrafiltrations were carried out with the Toribara apparatus as described previously(1,4).

The dog used in this study was anesthetized with sodium pentobarbital and bilaterally nephrectomized through flank incisions. A single injection was made into the femoral vein of a solution: 0.4 mg/ml in inulin-C^{14}OOH (about 1 μc/ml) and 80 mg/ml in inulin, and blood was collected from the jugular vein.

Results. In the previous study, 2 lots of inulin-C^{14}OOH (No. 35-211-5) and No. 35-92-21) ultrafiltered faster than ordinary inulin through cellophane membranes and were assumed to be smaller in molecular size. A later purchase (Lot No. 46-271-12) was ultrafiltered with results which confirmed our notion of the *variability* between batches. This lot ultrafiltered at a rate *slower* than ordinary inulin, as shown in Table I, indicating a larger molecular size.

Upon injection of this lot (No. 46-271-12) of inulin-C^{14}OOH into a nephrectomized dog, constant serum specific activity was observed for a period of 8½ hours, demonstrating the similar physiological behavior between this batch of labelled derivative and non-labelled inulin in a dog without kidneys.

It was not possible to purchase more of the original lots of labelled inulin, but Dr. J. Cohen (Dept. of Physiology) kindly gave us some of Lot No. 35-211-1 which we found to resemble our original batches in ultrafiltering faster than non-labelled inulin. Data for this ultrafiltration are listed in Table I.

Thoracic duct lymph was collected in a nephrectomized dog injected with this lot (No. 35-211-1) of inulin-C^{14}OOH and non-labelled inulin. The most revealing data are illustrated in the curves of lymph specific activity and lymph inulin plotted in Fig. 1. The C^{14} c.p.m./μg inulin were very high compared to serum in the early collections, when inulin was just appearing in the lymph. After one hour, the concentration of lymph inulin equalled serum inulin and after 2 hours, the specific activities of lymph and serum were about equal. The slowness of appearance of inulin in lymph in comparison with what is ordinarily observed in urine is a consequence of the smaller pores involved in lymph formation.

Discussion. Our experiment demonstrates the physiological differentiation of a labelled

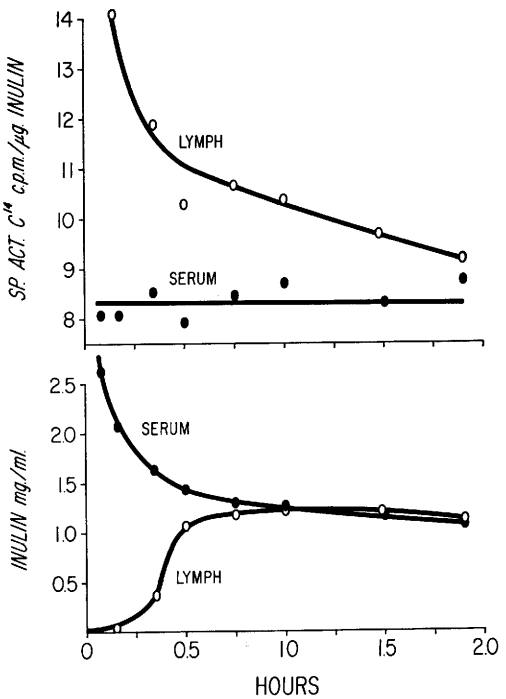

FIG. 1. Specific activity in c.p.m. inulin-C^{14}OOH per μg inulin (top curves) and inulin concentration (bottom curves) of lymph and serum following single intravenous injection into nephrectomized dog.

inulin derivative from ordinary inulin. Obviously, the process of lymph formation is one involving pores of a size capable of selectively impeding the diffusion or filtration of inulin over the smaller inulin-$C^{14}OOH$. These pores are therefore smaller in size than glomerular pores which show no such selection (1). Formation of lymph, however, was quantitatively insufficient to decrease *plasma* inulin specific activity to any degree as seen in Fig. 1. Thus, formation of lymph (which would recirculate in a normal animal) could not have been the reason for the significant decrease in urine specific activity previously reported in the intact dog(1). It must, therefore, be concluded that the kidneys themselves were in some manner responsible for the difference in behavior between the inulin derivative and inulin. An "extra-glomerular" rather than "extra-renal" process must have occurred to decrease the concentration of labelled inulin derivative in plasma in relation to inulin.

Although tissue storage or concentration of inulin (especially by the kidneys) is generally denied by most renal physiologists(5), there have been reports where inulin was found to be in higher concentration in rabbit kidney tissue than in blood or urine(6), and where inulin accumulated in rat kidneys during ureteral ligation(7). In the latter study, the high renal inulin was concluded to be due to glomerular filtration *after* ligation of the ureters, but could equally well have been caused by a tissue storage as suggested by our study and by Frey(6). Reinspection of Fig. 4 of the previous study(1) indicates that after the initial loss from the circulation of inulin with higher specific activity than the injected solution, urinary inulin was relatively constant from 2 to 4⅓ hours, when the experiment was terminated. Thus the "hotter" inulin presumably removed initially by the renal tissue did not come back by 4 hours. Eventually this inulin should no doubt be excreted and the observed urine specific activity would increase above the original value, but owing to the extremely low concentrations of inulin at that time this measurement would be technically practically impossible. It should be possible, however, to demonstrate a higher inulin specific activity in renal tissue itself shortly after injection.

From a practical viewpoint, the results reemphasize that careful evaluation of the particular situation under study should be made before employing the labelled inulin derivatives as an inulin tracer(1).

Summary. Following intravenous injection of inulin-$C^{14}OOH$ and inulin into a nephrectomized dog, the thoracic duct lymph was considerably higher than serum in specific activity, falling gradually to serum values. The fractionation of the smaller inulin-$C^{14}OOH$ molecules in lymph formation was thus similar to that observed in ultrafiltration through cellophane membranes, but it was quantitatively of insufficient magnitude to effect an observable decrease in serum inulin specific activity. It is suggested that the decrease in urine specific activity previously reported for the intact dog was due to a quicker uptake of inulin-$C^{14}OOH$ than non-labelled inulin by renal tissue.

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